Department of Microbiology, General Infirmary, Leeds
Peter Kite, *consultant microbiologist*
Warren N Fawley, *research assistant*
Daniel Thomas, *research assistant*

Table 1—*Performance of brush roll cultures compared with external (Maki roll) and internal (sonication) tip cultures. Values are numbers of catheters*

Catheter	Total No	Maki roll (colony forming units)		Sonication (colony forming units)		Brush roll	
		≥100	<100	≥100	<100	Positive	Negative
Sterile	66	0	66	0	66	0	66
Contaminated	10	0	10	0	10	0	10
Colonised	24	19	5	18	6	16	8
Catheter related sepsis	15	10	5	10	5	14	1

internally[4]). We assessed patients immediately after and one hour after removal of the brush, for evidence of systemic upset.

The external surface of the catheter was cultured by using the Maki roll technique[3] and the internal surface by a modified vortex and sonication technique.[4] The number of colony forming units at 24 hours were counted and recorded. The brush was rolled back and forth across a 5% horse blood agar plate at least four times.

Results

The organism responsible for most of the colonised catheters was the coagulase negative staphylococcus (18 catheters). Other organisms were *Escherichia coli* (4), *Staphylococcus aureus* (3), *Streptococcus faecalis* (2), *Candida albicans* (3), and a mixed growth (9). Brush and tip organisms were phenotypically similar in all positive cases.

The brush was positive in 14/15 (93%) (table 1) cases of catheter related sepsis. In colonised catheters, including catheter related sepsis, the sensitivity of the brush was 0.77 when compared with the Maki roll and sonication. When a negative brush culture was compared with sterile (no intraluminal or extraluminal growth) or contaminated (growth of <100 colony-forming units[3]) catheters, the specificity was 1.00. The brush therefore delivered a positive predictive value of 1.0 when compared with colonisation of the catheter tip, and a negative predictive value of 0.89.

Altogether, 36/71 (51%) catheters were found to be sterile in the group of patients thought to have infection caused by the catheter.

No patient recorded symptoms or signs of systemic upset during or after the procedure. A bacteraemia was induced in 3/50 (6%) patients after brushing, although repeat cultures at 24 hours were negative in all cases (and no antibiotics were used).

Comment

A reliable test not requiring removal of the catheter is needed to identify catheter related sepsis. In our study, the brush detected organisms in 77% of colonised catheters and 93% of cases of sepsis. It also detected organisms in 11.4% of patients in whom infection was not suspected. Although the brush missed 11% of colonised catheters, this compared favourably with the Maki roll (12%) and sonication (13%).

The brush may have the potential to reduce the removal of sterile catheters wrongly suspected of harbouring infection.

Funding: FAS Medical provided brushes and equipment to perform microbiological testing.
Conflict of interest: None.

1 Mughal MM. Complications of intravenous feeding catheters. *Br J Surg* 1989;**76**:15-21.
2 Pettigrew RA, Lang SDR, Haydock DA, Parry BR, Bremner DA, Hill GL. Catheter-related sepsis in patients on intravenous nutrition: a prospective study of quantitative catheter cultures and guidewire changes for suspected sepsis. *Br J Surg* 1985;**72**:52-5.
3 Maki DG, Weise CE, Sarafin HW. A semi-quantitative culture method for identifying intravenous catheter-related infection. *N Engl J Med* 1977;**296**:1305-9.
4 Sherertz RJ, Raad II, Belani A, Koo LC, Rand KH, Pickett DL, *et al.* Three-year experience with sonicated vascular catheter cultures in a clinical microbiology laboratory. *J Clin Microbiol* 1990;**28**:76-82.

(Accepted 20 August 1996)

Prevalence of psychiatric disorders in young people in the care system

Jacinta B McCann, Anthony James, Sylvia Wilson, Graham Dunn

See editorial by Chisholm and pp 1521, 1524

Recently, professional and political concern has grown about the severity and types of problems experienced by young people in the care system, this group being one of the most vulnerable in terms of psychological disturbance. Their risk of psychiatric ill health is higher than that of any other easily identified group in our society,[1] and studies have consistently identified a high incidence of behavioural problems.[2] No study has systematically examined the psychiatric disorders of adolescents being looked after by local authorities, so we aimed to assess the prevalence and types of psychiatric disorder among adolescents in the care system and compare them with those of a comparison group of adolescents.

Correspondence to:
Dr J B McCann, Leigh House Hospital, Chandler's Ford, Eastleigh, Hants SO53 1JY.

BMJ 1996;**313**:1529–30

Subjects, methods, and results

All adolescents aged 13 to 17 years looked after by the Oxfordshire local authority—that is, living in residential units and foster care—were included in this study. The comparison group consisted of adolescents with no previous or current contact with any local authority, matched for age and sex, and randomly selected from the same school or, when the adolescent was not attending school, from the same general practice. The study used a two phase, multimethod design. The first phase involved screening the adolescents using the Achenbach child behavioural checklist and the youth self report questionnaires.[3] Adolescents who were identified as high scorers as defined by Achenbach were approached to enter the second phase of the study, when they were interviewed using the Kiddie schedule for affective disorders and schizophrenia.[4] The main statistical analyses were carried out using SUDAAN version 6.34, using weighting methods for two phase sampling designs and allowing for non-responders as described by Pickles *et al.*[5]

Altogether 134 adolescents (69 boys and 65 girls) were being looked after by Oxfordshire local authority on a given date, 38 in residential units and 96 living with

Highfield Family and Adolescent Unit, Warneford Hospital, Oxford OX3 7JX
Jacinta B McCann, *senior registrar in child and adolescent psychiatry*
Anthony James, *consultant adolescent psychiatrist*
Sylvia Wilson, *research assistant*

Department of Biostatistics and Computing, Institute of Psychiatry, London SE5 8AF
Graham Dunn, *head of department and reader in biostatistics*

Table 1—*Prevalence (%) of psychiatric disorders among adolescents in the care system*

Diagnoses (DSM IIIR)	In care (n = 78*)	Controls (n = 97†)
Conduct disorder	28	0
Overanxious disorder	26	3
Major depressive disorder	23	3
Attention deficit disorder	14	2
Other depressive disorders	12	3
Avoidant disorder	8	1
Unspecified functional psychosis	8	0
Oppositional disorder	7	3
Panic disorder	4	0
Bipolar depressive disorder	4	0
Substance abuse	3	0
Bulimia nervosa	1	0
Anorexia nervosa	1	0
Obsessive-compulsive disorder	1	0
Phobic state	1	1
Separation anxiety disorder	0	1

*Among the 88 responders only 37 of the 47 high scorers were finally interviewed as 10 refused or were missing.
†Among the 100 responders 3 of the high scorers refused to be interviewed.

foster carers. Their mean age was 14.8 years (SD 2.5); the mean age at reception into care was 9.2 years (SD 5.3). The number of placements ranged from 1 to 24, with a median of 2; the cumulative time in care ranged from two months to 16 years, with a median of 2 years and 10 months.

The total response rate from the adolescents in the care system was 66% (88). Forty seven (53%) of the 88 responders were identified as high scorers. In the comparison group the response rate was 75% (100), with 12% identified as high scorers. The total weighted prevalence rate of psychiatric disorder in adolescents in the Oxfordshire care system was 67% compared with 15% in the comparison group, with 96% of adolescents in residential units and 57% in foster care having psychiatric disorders. The commonest diagnosis among adolescents in care was conduct disorder (22, 28%), followed by overanxious disorder (20, 26%). Worryingly, 23% (18) suffered from major depressive disorder, compared with 4% of controls. Eight per cent were diagnosed as having unspecified functional psychosis, with adolescents experiencing auditory hallucinations (table 1).

Comment

Adolescents in the care system showed particularly high levels of psychiatric disorder compared with adolescents living within their own families. Not only did they suffer from serious psychiatric disorders—notably, major depressive disorder; they also showed high levels of comorbidity, reflecting the complexity of these adolescents' difficulties. One of the most worrying findings was that a significant number of adolescents were suffering from severe, potentially treatable psychiatric disorders which had gone undetected. Local and health authorities need to direct their attention and ultimately resources to the types and complexities of psychiatric disturbances that are present in adolescents in the care system, as this disadvantaged group does not necessarily attract strong political advocates.

We thank the adolescents and their carers, along with Oxfordshire Social Services for their kind cooperation and participation in this study and Dr Stephen Wolkind for his encouragement and guidance.

Funding: Oxfordshire Regional Health Authority research scheme.

Conflict of interest: None.

1 Bamford F, Wolkind SN. *The physical and mental health of children in care: research needs*. London: Economic and Research Council, 1988.
2 Wolkind S, Rushton A. Residential and foster family care. In: Rutter M, Taylor E, Hersov L, eds. *Child and adolescent psychiatry*. Oxford: Blackwell Scientific Publications, 1994: 252-66.
3 Achenbach TM, Edelbrock CS. *Manual for the child behaviour checklist*. Burlington, Vermont: University Associates in Psychiatry, 1983.
4 Chambers W, Puig-Antich J, Hirsch M, Paez P, Ambrosini PJ, Tabrizi MA. The assessment of affective disorders in children and adolescents by semi-structured interview: test-retest reliability of the K-SADS-P. *Arch Gen Psychiatry* 1985;42:606-702.
5 Pickles A, Dunn G, Vazquez-Barquero JL. Screening for stratification in two-phase ("two-stage") epidemiological surveys. *Statistical Methods in Medical Research* 1995;4:75-91.

(Accepted 6 September 1996)

AN INFLUENTIAL DOCTOR

He read the right *BMJ* letter

The general practitioner who influenced my subsequent 25 years in practice, Jimmie, as he was always known, had worked hard through the difficult years of the 1930s, through the restrictions of the second world war, and had reached an honourable retirement age. After retiring for several years he had returned to help out in an emergency until new principals could be found, and I joined the practice as a locum. Jimmie was very much of the old school, brought up in an age when there were few active pharmaceuticals, and when a doctor in the Cotswolds, with his own cottage hospital, was all things to all patients. His many words of encouragement to a newly fledged doctor were spiced with good commonsense, but were based on a lifetime of experiences, the likes of which are long gone.

I shall always remember the story of his experience using the first antibacterial agent, Prontisil. In his cottage hospital he had a maternity unit, of course, and the patients were confined to the hospital for several days post partum in case they developed childbed fever. He told me that those of us working in the late 1960s with modern antibiotics aplenty could not begin to understand the feeling of horror of watching the swingeing fever take grip of a fit young woman, who had just given birth to her child, and realise that you could do precious little but pray. One such tragedy was starting to unfold in the mid-1930s when Jimmie happened to read the letters section of the *BMJ* over breakfast. He saw a report from a London teaching hospital of a dye which appeared to have antibacterial properties. He picked up the telephone and managed to contact the author of the letter, demanded a sample of his dye to use on his patient, and suggested that if it was put on the noon train from Paddington he would meet the train personally. Not expecting any response he met the train, and the guard handed him a neatly wrapped brown paper parcel in which there was a vial of crystals without any instructions. He had read that he would need two to three days' worth of treatment, so he divided the crystals into three, and dissolved a portion in sterile water. By this time the patient was almost comatose with a high fever, but Jimmie gave her the injections, and could hardly believe his eyes when the fever receeded. "And she's still around the town to this day," he would tell me, with a twinkle in his eye.—ANDREW CROWTHER *is a general practitioner in Tewkesbury, Gloucestershire*

We welcome filler articles of up to 600 words on topics such as *A memorable patient, A paper that changed my practice, My most unfortunate mistake,* or any other piece conveying instruction, pathos, or humour. If possible the article should be supplied on a disk.